TIMK 8545U1
Amendment Dated May 27, 2005
Reply to Office Action of April 29, 2005

What is claimed is:

1. (Currently amended) An integrated motor and traction drive comprising:

a motor supplying power at a high angular velocity, the motor comprising a stator, a rotor which revolves in the stator at a high angular velocity, and a sun roller affixed to the rotor having a first raceway; ~~and~~

a traction drive for receiving power at a high angular velocity and delivering the power at a lesser angular velocity, the traction drive comprising a carrier, an outer ring member having a fourth raceway eccentric to the first raceway of the sun roller and an output shaft for delivering power at a lesser angular velocity, and a loading planetary roller supported by the carrier having a third raceway that engages with the first raceway of the sun roller and the fourth raceway of the outer ring forming a converged wedge for transferring power between the sun roller and the outer ring[[.]];

a base plate having a pinhole for supporting the loading planetary roller, a third bore for supporting the sun roller, pinholes for supporting the supporting planetary rollers, and islands; and

a cover plate affixed to the base plate having a pinhole for supporting the loading planetary roller and a hole for hosting the sun roller.

2. (Currently amended) An integrated motor and traction drive according to claim 1, wherein the third raceway engages with the first raceway of the sun roller and

the fourth raceway of the outer ring to satisfy the equation

$$\frac{K_S}{K_R} = \mu_o \sin\delta - 2\sin^2\left(\frac{\delta}{2}\right) \leq \mu_m \sin\delta - 2\sin^2\left(\frac{\delta}{2}\right) \text{[[.]]};$$

wherein K_S is an effective support stiffness of the loading planetary roller;

wherein K_R is an effective contact stiffness between the loading planetary roller and the sun roller and between the loading planetary roller and the outer ring;

wherein μ_m is a maximum available traction coefficient.; and

wherein δ is an operating wedge angle.

3. (Original) An integrated motor and traction drive according to claim 1, further comprising a supporting planetary roller supported by the carrier having a second raceway that engages with the first raceway and fourth raceway to self-balance internal forces.

4. (Original) An integrated motor and traction drive according to claim 3, wherein the supporting planetary roller comprises a pin shaft supported by the carrier and a bearing affixed to the pin shaft.

5. (Original) An integrated motor and traction drive according to claim 1, further comprising a housing affixed to the stator and the carrier having a first bore for supporting the sun roller and a fourth bore for supporting outer ring.

6. (Currently amended) An integrated motor and traction drive according to claim 5, wherein the housing comprises:

a motor housing attached to the carrier and affixed to the stator, a motor cover attached to the motor housing having athe first bore for supporting the sun roller, a bearing cup plate attached to the motor cover to secure the sun roller; and

a traction drive housing attached to the carrier having athe fourth bore for supporting the outer ring.

7. (Original) An integrated motor and traction drive according to claim 1, wherein the loading planetary roller comprises:

a support bearing having an outer race and an inner race, such that the outer race of the support bearing engages an inner surface of the loading planetary roller allowing the loading planetary roller to rotate freely;

an elastic insert having an outer surface and a center hole, such that the outer surface of the elastic insert engages the inner race of the support bearing; and

a pin shaft engaged with the center hole of the elastic insert, such that the loading planetary roller, support bearing, and elastic insert are supported by the carrier and the third raceway of the loading planetary roller engages the first raceway of the sun roller and fourth raceway of the outer ring forming a converged wedge for transferring power from the first raceway to the fourth raceway.

8. (Canceled).

9. (Original) An integrated motor and traction drive comprising:

a motor supplying power at a high angular velocity, the motor comprising a stator, a rotor which revolves in the stator at a high angular velocity, and a sun roller affixed to the rotor having a first raceway;

a traction drive for receiving power at a high angular velocity and delivering the power at a lesser angular velocity, the traction drive comprising:

a carrier comprising a base plate having a pinhole for supporting the loading planetary roller, a third bore for supporting the sun roller, pinholes for supporting the supporting planetary rollers, and islands; and a cover plate affixed to the base plate having a pinhole for supporting the loading planetary roller and a hole for hosting the sun roller;

an outer ring member having an a fourth raceway eccentric to the first raceway of the sun roller and an output shaft for delivering power at a lesser angular velocity;

a loading planetary roller supported by the carrier having a third raceway that engages with the first raceway of the sun roller and the fourth raceway of the outer ring forming a converged wedge for transferring power between the sun roller and the outer ring, the loading planetary roller comprising a support bearing having an outer race and an inner race, such that the outer race of the support bearing engages an inner surface of the loading planetary roller allowing the loading planetary roller to rotate freely; an elastic insert having an outer surface and a center hole, such that the outer surface of the elastic insert engages the inner race of the support bearing; and a pin shaft engaged with the center hole of the elastic insert, such that the loading planetary roller,

support bearing, and elastic insert are supported by the carrier and the third raceway of the loading planetary roller engages the first raceway of the sun roller and fourth raceway of the outer ring forming a converged wedge for transferring power from the first raceway to the fourth raceway;

a supporting planetary roller supported by the carrier having a second raceway that engages with the first raceway and fourth raceway to self-balance internal forces; and

a housing affixed to the stator and the carrier having a first bore for supporting the sun roller and a fourth bore for supporting outer ring.

10. (Original) An integrated motor and traction drive according to claim 9, wherein the supporting planetary roller comprises a pin shaft supported by the carrier and a bearing affixed to the pin shaft.

11. (Original) An integrated motor and traction drive according to claim 9, wherein the housing comprises:

a motor housing attached to the carrier and affixed to the stator, a motor cover attached to the motor housing having a first bore for supporting the sun roller, a bearing cup plate attached to the motor cover to secure the sun roller; and

a traction drive housing attached to the carrier having a fourth bore for supporting the outer ring.

12. (Currently amended) An integrated motor and traction drive according to claim 9, wherein the third raceway engages with the first raceway of the sun roller and

the fourth raceway of the outer ring to satisfy the equation

$$\frac{K_S}{K_R} = \mu_o \sin\delta - 2\sin^2\left(\frac{\delta}{2}\right) \leq \mu_m \sin\delta - 2\sin^2\left(\frac{\delta}{2}\right) \text{[[.]]};$$

wherein K_S is an effective support stiffness of the loading planetary roller;

wherein K_R is an effective contact stiffness between the loading planetary roller and the sun roller and between the loading planetary roller and the outer ring;

wherein μ_m is a maximum available traction coefficient.; and

wherein δ is an operating wedge angle.